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**For**

EL 572 620 838 US

## **“SHOW ME” USER INTERFACE COMMAND WITH SCROLL TRACKING**

### **BACKGROUND**

The invention relates to facilitating a user's ability to read electronic document content on a display device such as a computer monitor.

5           The term "content" encompasses a wide variety of information including text, images, multimedia presentation, or any combination of them. Computer program applications are widely used to display and manipulate such content. A user of a computer system can access content that is stored locally or remotely. Computer systems generally provide a graphical user interface (GUI) that provides windows of the kind that allow applications to display content in a display  
10       pane. Tools that allow the user of a computer to move comfortably through the text of an electronic document or an image display are important and are included in various forms in GUI applications. Reading on a computer display requires eye movement. The process becomes more challenging when the reading requires following the displayed text movement if text is scrolled to reveal the previously unseen text. When the text displayed on the  
15       computer screen is scrolled, the user must follow the movement of the text to know where the reading had left off before continuing the reading of the now visible text.

          A number of techniques currently exist for scrolling text. Most commonly, text is scrolled by jumping to the next screenful of text. The displayed text disappears and the new text appears. Another technique is scrolling one line at a time and thus moving text until it  
20       reaches the top of the screen. In another technique, the user drags the scrollbar. This technique becomes cumbersome when working with a large document because it increases already highly sensitive scrollbar movement. It is also possible to drag the text or the image. This typically requires a significant mouse movement as the drag often traverses most of the height of the screen. It also may introduce a problem inadvertently changing the horizontal  
25       alignment of the page any time the page is wider than the window as a hand drag tool typically drags in both the x- and the y-directions.

## SUMMARY

The invention facilitates a user's ability to view and understand a document being viewed on an electronic display. Because the invention combines smooth scrolling and a visual indicator, a user is easily able to differentiate between previously read and unread portions of the document. Although most generally applicable to text documents, the invention is also applicable to documents containing graphic and multimedia objects.

In response to a user input requesting a "show me" operation, a visual indication is added to the displayed text as a reference mark at a point selected by the user. This indicator is intended to delineate the previously read part of the document from a further portion of the document. The document is then smooth-scrolled until the location in the document that was selected by the user is at or close to a target location. If the location has text, the text is displayed. If the location has a graphic or multimedia object, the object is optionally displayed in a way appropriate to the size and nature of the object.

Thus, the invention provides methods and apparatus, including computer program products, for displaying a document on a display device. Methods include receiving a user input selecting a location in a document displayed in a display pane and requesting a show-me operation, and, in response to the input, displaying a visual reference mark indicating the selected location in the pane, then smoothly scrolling the document and the reference mark in the pane until the selected location is at a target location in the pane, and then removing the visual reference mark.

Particular implementations can include on or more of the following features. The user input selects a location corresponding to a line of text. The user input selects a location corresponding to a graphic object. The user input selects a location corresponding to a video object. The user input can point to a text location in the document, draw the reference mark as a reference line perpendicular to a scrolling direction and intersecting the text location and smoothly scroll the document and the reference line to the target location, the target location being close to a start edge of the pane. The target location is within two text lines of the start edge of the pane. A line of text at the selected location is highlighted at about the time the location is selected and used as the reference mark; alternatively, the highlighting is supplemental to the reference mark. Highlighting can be of any conventional kind, such as reverse colors, addition of a color background, or changing font style or size, for example.

The invention can be implemented to realize one or more of the following advantages. It provides a quick and efficient speed of the movement that is cognitively easy for the user to follow. The user does not have to maintain his focus and uninterrupted attention on the screen and apply manual manipulation while the read text is moving. The invention provides for the movement slow enough to permit the scrolling of the document to be followed by the eyes. Consequently, it makes it easy for the user to preserve context while reading. The invention does not make use of the scrollbar and is not affected by the sensitivity of the scrollbar movement, especially when working with a large document.

The details of one or more embodiments of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

## DESCRIPTION OF DRAWINGS

FIGS. 1 and 2 are flowcharts of processes in accordance with the invention.

Like reference symbols in the various drawings indicate like elements.

## DETAILED DESCRIPTION

As shown in FIG. 1, a system operating in accordance with the invention in displaying an electronic or digital document performs a process 200 in response to a user command. Generally, the process will be implemented in a computer program application, such as a document viewer application, as will now be described.

Initially, the application receives a “show me” command from a user indicating the user’s desire to view a portion of the document (step 202). Such a desire can arise, for example, when the user starts to read a new paragraph. Although the user is not necessarily at the bottom of the pane in which the document is being displayed, the user is mentally changing contexts. Therefore, this is a logical point for the user to stop reading, for the application to update the display of the document, and for the user then to resume reading.

In entering the command, the user selects a portion of the document by selecting a location in the document. This can be done by a variety of ways, such as by pointing and clicking with a pointer device such as mouse. Alternatively, the user can select the location by keystroke on a keyboard, or by a combination of a pointer and keyboard. The show me command can be entered by one or more keystrokes entered in conjunction with a selection

action, or by a sequence of keystroke and/or pointer device actions. The selected location can be in a line of text, between lines of text, in a graphic objects, in a multimedia object (such as a video clip), in a linking object such as a hypertext link, or in any other kind of object that may be found in an electronic document.

5 In response, the application marks the selected location or object with a visual indicator or reference mark (step 204). The reference mark can be generated in a variety of ways, including artifacts overlaid on the document and temporary modifications of the displayed appearance of the document. Possible modifications include modifying the document background, foreground, or a combination of these. The reference mark can be  
10 any visible indicator inserted into or adjacent to the already-existing content of the document. The mark can be made using any graphical symbol, text style or text that can act as a reference mark. For example, if text is displayed, the process can overlay a blue line on the document at the location selected by the user in a direction perpendicular to the line-to-line reading direction to allow for various text configurations. If the selected portion is a graphic  
15 object or a video clip, a display area for the object or clip in the document can be surrounded or otherwise delimited by a reference mark artifact.

Next, the application smoothly scrolls the content and the visual indicator across the display pane until the selected location is close to a target location (step 206). The scrolling is performed at a smooth pace, slow enough that the user can visually follow the content and the reference mark as it is moving. It is advantageous to scroll at the fastest speed that users  
20 can easily follow and that provides an appearance of smooth rather than jerky motion.

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The target location can be preset by the application or it can be set by the user as a user preference. The target location can defined in terms of a document scrolling or flow direction (e.g., top to bottom or left to right) in which the document is naturally read. The  
25 target location can differ depending on the nature of the portion selected by the user. For example, the target location if text is selected can be one text line away from the starting edge of the display pane (according to the flow direction), while the target location for a multimedia video clip can be at the very top of the display pane or even a new pane created for the clip.

30 After the smooth scrolling, the application performs any operations required to show the user the selected portion, according to the nature of what the user selected (step 208). A particular set of such operations will be described in reference to FIG. 2. If a new window is

the target location and is opened to show the selected portion, both the scrolling and showing can be done essentially simultaneously. In general, however, the scrolling will be done first.

When, or shortly after, the smooth scrolling is completed, the reference mark is removed from the display (step 210) and the process 200 is finished.

5        FIG. 2 shows one set of operations that can be implemented to perform step 208 of FIG. 1. According to the nature of the selected portion (decision step 220), different operations can be performed to show the selected portion to the user.

10        If the user selects a video object, for example, an area is defined at the target location for displaying the selected video (step 222). According to the target location defined by the application or by the user, the area can be within the pane displaying the document, or in a separate pane. The target location definition can also define a default size for the video display area. The video is then displayed in the area (step 224).

15        If the user selects a graphic object, such as a vector or raster artwork object, for example, the application optionally determines a magnification for the object (step 226). By default, the magnification may be determined by the magnification of the document as it is being displayed. Generally, the target location of a graphic object will be within the display area of the document and not in a separate pane, although the option of a separate pane for a graphic object can be provided. The user can optionally define a minimum, maximum, and preferred size of display for a graphic object, as well as a minimum and maximum  
20        magnification. The user can optionally specify a preference for viewing graphic objects with no change in size from the size displayed with the rest of the document. The object is displayed at the target location according to any constraints defined by the user or application (step 228).

25        The application can be implemented to recognize as a special case the case of a graphic object that contains text. For this case, magnification can be determined so that the displayed object is enlarged at least so much as to show the contained text at a desired size. For example, if the primary size for the contained text is 6 point and the desired text size is 10 point, the correct magnification would be 1.67. To achieve this magnification, the might have to fit as much of the object as would fit in the display pane, adding scroll bars to the  
30        window if the image did not fit. Alternatively, such a graphic object can be magnified and displayed as described earlier.

If the selected portion is document text or white space associated with text, the application simply displays the text as and after scrolling the document to the target location (step 230).

5           The invention can be implemented in digital electronic circuitry, or in computer hardware, firmware, software, or in combinations of them. Apparatus of the invention can be implemented in a computer program product tangibly embodied in a machine-readable storage device for execution by a programmable processor; and method steps of the invention can be performed by a programmable processor executing a program of instructions to  
10       perform functions of the invention by operating on input data and generating output. The invention can be implemented advantageously in one or more computer programs that are executable on a programmable system including at least one programmable processor coupled to receive data and instructions from, and to transmit data and instructions to, a data storage system, at least one input device, and at least one output device. Each computer  
15       program can be implemented in a high-level procedural or object-oriented programming language, or in assembly or machine language if desired; and in any case, the language can be a compiled or interpreted language. Suitable processors include, by way of example, both general and special purpose microprocessors. Generally, a processor will receive instructions and data from a read-only memory and/or a random access memory. The essential elements  
20       of a computer are a processor for executing instructions and a memory. Generally, a computer will include one or more mass storage devices for storing data files; such devices include magnetic disks, such as internal hard disks and removable disks; magneto-optical disks; and optical disks. Storage devices suitable for tangibly embodying computer program instructions and data include all forms of non-volatile memory, including by way of example  
25       semiconductor memory devices, such as EPROM, EEPROM, and flash memory devices; magnetic disks such as internal hard disks and removable disks; magneto-optical disks; and CD-ROM disks. Any of the foregoing can be supplemented by, or incorporated in, ASICs (application-specific integrated circuits).

30           To provide for interaction with a user, the invention can be implemented on a computer system having a display device such as a monitor or LCD screen for displaying information to the user and a keyboard and a pointing device such as a mouse or a trackball by which the user can provide input to the computer system. The computer system can be

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What is claimed is:

1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805 2806 2807 2